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(71) Applicant (*for all designated States except US*): MOXTRONICS, INC. [US/US]; 504 N. Village Circle, Columbia, MO 65203 (US).

(72) Inventors; and
(75) Inventors/Applicants (*for US only*): WHITE, Henry, W. [US/US]; 2814 Wild Plum Court, Columbia, MO 65201 (US). RYU, Yungryel [KR/US]; 504 N. Village Circle, Columbia, MO 65203 (US). LEE, Tae-Seok [KR/US]; 2476 Warm Springs Lane, Naperville, IL 60564 (US).

(74) Agent: RADKE, Terrance, J.; Lucash, Gesmer & Updegrove, LLP, 40 Broad Street, Boston, MA 02109 (US).

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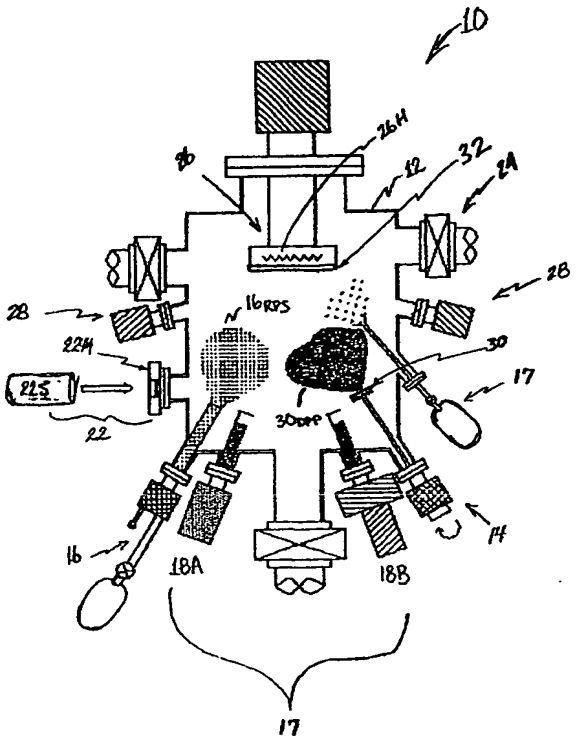
(54) Title: A HYBRID BEAM DEPOSITION SYSTEM AND METHODS FOR FABRICATING METAL OXIDE ZNO FILMS, P-TYPE ZNO FILMS, AND ZNO-BASED II-VI COMPOUND SEMICONDUCTOR DEVICES



(57) Abstract: A hybrid beam deposition (HBD) system and methods according to the present invention utilizes a unique combination of pulsed laser deposition (PLD) technique and equipment with equipment and techniques that provide a radical oxygen rf-plasma stream to effectively increase the flux density of available reactive oxygen at a deposition substrate for the effective synthesis of metal oxide thin films. The HBD system and methods of the present invention further integrate molecular beam epitaxy (MBE) and/or chemical vapor deposition (CVD) techniques and equipment in combination with the PLD equipment and technique and the radical oxygen rf-plasma stream to provide elemental source materials for the synthesis of undoped and/or doped metal oxide thin films as well as the synthesis of undoped and/or doped metal-based oxide alloy thin films.

WO 2004/020686 A2

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